

CLAIMS

What Is Claimed Is:

1. A method of making a single unit post or obturator having filling material attached thereto comprising:
5 applying a corona or plasma treatment to the surface of the post or obturator; and
 applying resinous filling material to the surface-treated post or obturator.
2. The method of claim 1 wherein the corona treatment takes place in
atmospheric air at room temperature.
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3. The method of claim 1 wherein the plasma treatment takes place in an
atmosphere selected from the group consisting of air, nitrogen, argon, oxygen, nitrous
oxide, helium, tetrafluoromethane, tetrafluoride, water vapor, carbon dioxide, methane,
ammonia and mixtures thereof.
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4. The method of claim 3 wherein the plasma treatment takes place in an
atmosphere containing a mixture of oxygen and carbon tetrafluoride.
5. The method of claim 2 wherein the corona treatment takes place in the
20 range of about a few seconds to about two hours.
6. The method of claim 3 wherein the plasma treatment takes place in the
range of about a few seconds to about two hours.
- 25 7. The method of claim 1 wherein more than one corona or plasma treatment
is applied to the surface of the post or obturator.
8. The method of claim 1 wherein the post or obturator is fabricated of a
metal, plastic, ceramic, or a composite material.
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9. The method of claim 8 wherein the composite material comprises fiber-reinforced composite material, filler-reinforced composite material or a mixture thereof.

10. The method of claim 8 wherein the composite material comprises a
5 polymeric matrix.

11. The method of claim 10 wherein the polymeric matrix comprises
polyamides, polyester, polyolefins, polyimides, polyarylates, polyurethanes, vinyl esters
or epoxy-based materials, styrenes, styrene acrylonitriles, ABS polymers, polysulfones,
10 polyacetals, polycarbonates, polyphenylene sulfides, polyarylsulfides, acrylonitrile-
butadiene-styrene copolymers, polyurethane dimethacrylates, or a mixture thereof.

12. The method of claim 11 wherein the polymeric matrix further comprises
polymerization initiators, polymerization accelerators, ultra-violet light absorbers, anti-
15 oxidants, fluorescent whitening agents, or free radical initiators.

13. The method of claim 9 wherein the filler comprises silica, silicate glass,
quartz, barium silicate, strontium silicate, barium borosilicate, strontium borosilicate,
borosilicate, lithium silicate, amorphous silica, ammoniated or deammoniated calcium
20 phosphate and alumina, zirconia, tin oxide, titania, or a mixture thereof.

14. The method of claim 8 wherein the metal comprises metals or alloys of
Pd, Pt, Rh, Ir, Au, Ag, Ti, Co, Mo or mixtures.

25 15. The method of claim 14 wherein the mixtures of metals or alloys
comprise AgPd, AuPtPd, TiAlFe, TiAlV, CoCrMo, stainless steel or brass.

16. The method of claim 8 wherein the ceramic comprises alumina, zirconia,
mullite, spinel, porcelain, titania, lithium disilicate, leucite, amorphous glass, lithium
30 phosphate, or a combinations thereof.

17. The method of claim 1 wherein the resinous filling material comprises a polymeric material.

18. The method of claim 1 wherein the resinous filling material comprises a thermoplastic, thermoset, chemoplastic, material or mixture thereof.

19 The method of claim 18 wherein the thermoplastic material comprises gutta-percha.

20. The method of claim 17 wherein the polymeric material comprises polypropylenes, polyethylenes, polyamides, fluoropolymers, polyesters, polyphosphazenes, polyanhydrides, polysulfides, polyethers, epoxies, polycarbonates, polystyrenes, polyisoprenes, polybutadienes, polyphenylene oxides, silicone rubbers, polylactides, polyglycolides, polycaprolactones, polyanhydrides, polyimides, polyurethanes, polyesteramides, polyorthoesters, polydioxanones, polyacetals, polyketals, polycarbonates, polyorthocarbonates, polyphosphazenes, polyhydroxybutyrates, polyhydroxyvalerates, polyalkylene oxalates, polyethylene oxides, polyacrylates/methacrylates, polyalkylene succinates, poly(malic acid) polymers, polymaleic anhydrides, poly(methylvinyl) ethers, poly(amino acids), chitin, chitosan, polyolefins, polyarylates, polyurethanes, vinyl esters, styrenes, styrene acrylonitriles, ABS polymers, polysulfones, polycarbonates, polyphenylene sulfides, polyarylsulfides, acrylonitrile-butadiene-styrene copolymers, polyurethane dimethacrylates (hereinafter abbreviated to "UDMA", triethylene glycol dimethacrylate (hereinafter abbreviated "TEGDMA"), polyethylene glycol dimethacrylate (hereinafter abbreviated "PEGDMA"), urethane dimethacrylate (hereinafter abbreviated "UDMA"), hexane diol dimethacrylate (hereinafter abbreviated "1,6 HDDMA") and polycarbonate dimethacrylate (hereinafter abbreviated "PCDMA") and copolymers, terpolymers, or combinations or mixtures thereof.

21. The method of claim 1 wherein the resinous filling material further comprises a filler.

22. The method of claim 21 wherein the filler comprises inorganic or organic fillers.
- 5 23. The method of claim 21 wherein the filler comprises particulates or fibrous fillers.
- 10 24. The method of claim 21 wherein the filler comprises silica, silicate glass, quartz, zinc oxide, barium sulfate, barium silicate, strontium silicate, barium borosilicate, strontium borosilicate, borosilicate, lithium silicate, amorphous silica, bismuth compounds such as BiOCl, ammoniated or deammoniated calcium phosphate and alumina, zirconia, tin oxide, and titania, apatites, glass fillers, calcium silicate, hydroxyapatites, barium sulfate, bismuth subcarbonate, ytterbium oxide, ytterbium fluoride, ytterbium iodine, bismuth oxide, bismuth fluoride, barium oxide, and tantalum oxide.
- 15 25. The method of claim 23 wherein the fibrous fillers comprise glass, ceramic, metal, carbon, graphite, polymeric such as cellulose, polyamide, aramid, polyester, polyaramid, acrylic, vinyl and modacrylic, polyolefin, polytetrafluorethylene, or mixtures thereof.
- 20 26. The method of claim 21 wherein the filler comprises a bioactive filler.
- 25 27. The method of claim 26 wherein the bioactive filler comprises bioglass, calcium phosphate, Portland cement, hydroxyapatite, tricalcium phosphate, a di- or polyphosphonic acid, an anti-estrogen, a sodium fluoride preparation, a substance having a phosphate to calcium ratio similar to natural bone, or mixtures thereof.
- 30 28. The method of claim 26 wherein the bioactive filler comprises bone chips, bone crystals, mineral fractions of bone or teeth, or mixtures thereof.

29. The method of claim 26 wherein the bioactive filler comprises particulate or fibrous filler in nanosize, microsize, macrosized form, or mixtures thereof.

30. The method of claim 1 wherein the resinous filling material further comprises a polymeric resin, additional filler, pigment, dye, antibiotic, cariostatic, antibacterial, anti-inflammatory, biologically active or therapeutic material.

31. A post manufactured by the method of claim 1.

32. The post of claim 31 wherein the resinous material is bonded to the post at a bond strength greater than about 2.3 MPa.

33. An obturator manufactured by the method of claim 1.

34. The obturator of claim 33 wherein the resinous material is bonded to the obturator at a bond strength greater than about 2.3 MPa.

35. A method making a dental restoration comprising a veneer bonded to a dental understructure comprising:
applying a corona or plasma treatment to the surface of the dental understructure;
and
applying the veneer to the surface-treated dental understructure.

36. The method of claim 35 wherein the dental understructure is fabricated of a metal, plastic, ceramic, or a composite material.

37. The method of claim 36 wherein the composite material comprises fiber reinforced composite material, particulate reinforced composite material, or a mixture thereof.

38. The method of claim 35 wherein the veneer material comprises a resin composite material.
39. The method of claim 38 wherein the resin composite material comprises
5 fiber reinforced composite material, particulate reinforced composite material, or a mixture thereof.
40. The method of claim 35 wherein the corona treatment takes place in
10 atmospheric air at room temperature.
41. The method of claim 35 wherein the plasma treatment takes place in an atmosphere selected from the group consisting of air, nitrogen, argon, oxygen, nitrous oxide, helium, tetrafluoromethane, tetrafluoride, water vapor, carbon dioxide, methane, ammonia and mixtures thereof.
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42. The method of claim 35 wherein the plasma treatment takes place in an atmosphere containing a mixture of oxygen and carbon tetrafluoride.
43. The method of claim 35 wherein the corona treatment takes place in the
20 range of about a few seconds to about two hours.
44. The method of claim 35 wherein the plasma treatment takes place in the range of about a few seconds to about two hours.
45. The method of claim 35 wherein more than one corona or plasma
25 treatment is applied to the surface of the post or obturator.
46. A dental restoration formed by the method of claim 35.
47. The dental restoration of claim 46 wherein the veneer is bonded to the
30 dental understructure at a bond strength greater than about 2.3 MPa.